

Questions & Answers

Florida Municipal Injection Wells



July 2000

What are the different types of underground injection wells?

Class I: Class I wells are technologically sophisticated wells that inject large volumes of hazardous and non-hazardous wastes, including municipal wastewater, into deep, isolated rock formations that are below the lowermost underground source of drinking water (USDW).

Class II: Class II wells inject fluids associated with oil and natural gas production. Most of the injected fluid is brine that is produced when oil and gas are extracted from the earth.

Class III: Class III wells inject super-hot steam, water, or other fluids into mineral formations, which is then pumped to the surface and extracted.

Class IV: Class IV wells inject hazardous or radioactive wastes into or above underground sources of drinking water. These wells are banned under the Underground Injection Control Program because they directly threaten the quality of underground sources of drinking water.

Class V: Class V wells use injection practices that are not included in the other classes. Some Class V wells are technologically advanced wastewater disposal systems used by industry, but most are "low-tech" holes in the ground. Generally, they are shallow and depend upon gravity to drain or "inject" liquid waste into the ground above or into underground sources of drinking water. Their simple construction provides little or no protection against possible groundwater contamination, so it is important to control what goes into them.

Where are the Class I municipal underground injection wells in Florida?

[Click here for a map of Florida injection wells.](#)

Why is municipal wastewater injected into the ground?

Underground injection is an alternative method of disposal for fluids and has been used because of the problems created by surface disposal of treated wastewater into rivers, streams, and coastal waters. Facilities were constructed by cities and counties to dispose of municipal wastewater by injection. Some injection facilities in Florida dispose of up to 100 million gallons of treated wastewater per day.

Is the municipal wastewater treated prior to injection?

Yes. The State of Florida requires the effluent from wastewater treatment plants receive at least secondary treatment prior to disposal. This is also the basic requirement if disposal is through injection wells. Injection of raw sewage down a disposal well is a violation of the State of Florida rules.

At what depth is the municipal wastewater being injection into

Many municipalities in Florida dispose of treated wastewater into Class I municipal wells which are located several thousand feet below the ground surface. These wells inject wastewater into a zone containing salt water 650 feet to 3,500 feet below landsurface. This is known as the Boulder Zone. The Boulder Zone is below the deepest underground source of drinking water which is hundreds, sometimes thousands, of feet below any drinking water wells.

Is municipal injection of wastewater in Florida currently causing contamination of groundwater?

There are currently 3 municipal wastewater Class I deep-well facilities located in South and South west Florida which have exhibited some evidence of fluid movement into the base of the USDW by monitoring wells or other such means. These facilities are the Miami-Dade South Regional District facility, Albert Whitted Facility in St. Petersburg, and the Seacoast Utilities facility. The movement is due to the inadequate geologic confinement, not well design, construction, or operation. There are approximately 40 other facilities at which similar geology makes it possible that upward fluid movement may be occurring or may occur in the future.

What is the difference between ground water and drinking water?

Groundwater is all water found beneath the earth's surface. The Safe Drinking Water Act required EPA to protect all groundwater which contains less than 10,000 milligrams/liter (mg/l) of total dissolved solids (TDS) as a potential source of drinking water.

Drinking water sources are usually classified as containing less than 500 mg/l TDS. Some ground water drinking water sources contain greater than 500 mg/l TDS, however, this ground water must go through a desalinization treatment before it can be used as potable water.

What are the public health threats of continued underground injection?

Currently, there are no immediate threats to public health from injection of wastewater into wells with potential fluid movement into the USDWs. EPA's intent, however, is to ensure that if injection continues, future injection will not endanger the underground source of drinking water.

How is EPA going to address the issues concerning fluid movement into underground sources of drinking water?

Current federal regulations require Class I facilities that exhibit movement of fluids into any USDW to abandon deep well injection all together and seek alternative disposal means such as surface water and ocean disposal. While this option remains under consideration, EPA recognizes the benefits to the coastal environment as a result of the discontinued use of ocean, river, and estuary outfalls. Therefore, EPA is proposing and seeking comments on several regulatory options for addressing the problem. One option is to require sufficient advanced wastewater treatment and disinfection of injected fluids for all wells with potential fluid movement into an underground source of drinking water, ensuring that the injection operation does not endanger a USDW. The second options would allow through a demonstration the underground sources of drinking water are not being endangered. Both regulatory options under consideration could allow movement of fluids, but not movement that could contaminate the underground source of drinking water. Under no circumstance would EPA allow facilities to inject in such a manner that would contaminate USDWs. If a municipality cannot make such a demonstration, they will be required to provide sufficient advance treatment or close their well and use other methods of disposal.

Would EPA change the UIC regulations to weaken the protection of Florida's environment?

No. Under current regulations, a Class I facility cannot cause movement of fluid into an underground source of drinking water regardless of the quality of the fluid. Current upward movement of fluids being detected in Florida cannot be contained since it is caused by leaky geology and not the well itself. The Federal Safe Drinking Water Act does not allow under any circumstance injection that endangers underground sources of drinking water by contamination. Therefore, EPA's current regulatory approach requires that there be no movement of fluid into a USDW regardless of the quality to ensure that these wells are not endangered. EPA cannot and does not intend to weaken the protection of underground sources of drinking water mandated by the Safe Drinking Water Act. The proposed rule to address the problem of fluid movement will continue to provide assurances that underground sources of drinking water are not endangered.

Will any proposal by EPA weaken water quality standards?

No. The options in the proposed rule require that the facilities comply with what is referred to as the endangerment standard. According to 40 CFR §144.12(a), the endangerment standard requires that, "No owner or operator shall construct, operate, maintain, convert, pub, abandon, or conduct any other injection activity in a manner that allows the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any primary drinking water, if the presence of that contaminant may cause a violation of any primary drinking water regulation under 40 CFR part 142 or may otherwise adversely affect the health of persons. The applicant for a permit shall; have the burden of showing that the requirements of this paragraph are met."

Can the facility continue to operate if there is fluid movement?

Under current UIC regulations, the owners or operators of existing Class I municipal injection wells that have exhibited fluid movement must cease operations as the only remedy to regulatory compliance. The few disposal alternatives, however, (i.e., surface water disposal) are exceedingly restrictive because of the need to protect Florida's fragile streams, estuaries, wetlands, rivers and ocean beaches. By focusing on the quality of the wastewater disposed and specific effects on the aquifers, the rule would allow existing Class I municipal injection wells to continue to be used while underground sources of drinking water are protected.

However, under regulatory changes currently being considered, there would be two ways in which injection could legally continue. The first would allow injection as long as no fluids move out of the injection zone. This is the current regulatory approach. Under the proposed regulatory change the second would allow injection if the facility can demonstrate that by the time the fluid has traveled to the base of the underground source of drinking water, there are no contaminants present in the fluid that could endanger the USDW. For example, a contaminant might not move with the wastewater, or might (in the case of biological contaminant) die before the fluid has moved into the underground source of drinking water. The proposed criteria for this demonstration would require that the facility demonstrate through hydrogeologic study and treatment monitoring to both the State of Florida and EPA that contamination would not occur from injection and possibly apply advanced wastewater treatment prior to injection.

What would happen if a facility is required to stop injection?

The facility would have to find another disposal option for the wastewater. They would have to meet the standards for either surface discharge or ocean outfall. However, injection could not immediately cease. A new treatment facility would need to be funded, designed and constructed.

How much will this rule cost?

The economic analysis for this proposed rule compares the cost of compliance under existing regulations with the cost of compliance under the two options that are co-proposed in this action. Municipal government and private entities are the likely owners and/or operators of Class I wells in Florida that are affected by the rule and are expected to pass their costs on to their customers.

Depending on the size and level of wastewater treatment necessary at each of the facilities, the estimated capital costs to facilities to comply with existing requirements ranges from \$721 to 2,882 million with annualized costs from \$203 to 811 million. This would pay for the closing of injection facilities and construction/operation of facilities designed for surface water disposal.

Under the first rule option, capital costs are estimated at between \$254 and 1,678 million and annualized costs (capital & operating) from \$131 to 587 million. However, this proposed regulatory option would result in an annualized savings of between \$72 and 224 million compared to the costs of compliance with the existing requirement.

Under the second rule option, capital costs are estimated from \$201 to 1,329 million and annualized costs (capital & operating) from \$101 to 453 million. However, this proposed regulatory option would result in an annualized savings of between \$102 and 358 million compared to the costs of compliance with the existing requirement.

Can I make comments about the proposed rule?

Yes. Written comments on the proposed rule should be sent to:

Nancy Marsh
Ground Water & UIC Section
US EPA, Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960
(404) 562-9450

Comments must be received at the above address by September 5, 2000.